Total Life Cycle Management Assessment Tool

(TLCM AT)

August 2004

Original Vision

Provide fully integrated comprehensive information, analysis and forward looking decision quality advice.

Overall Goals

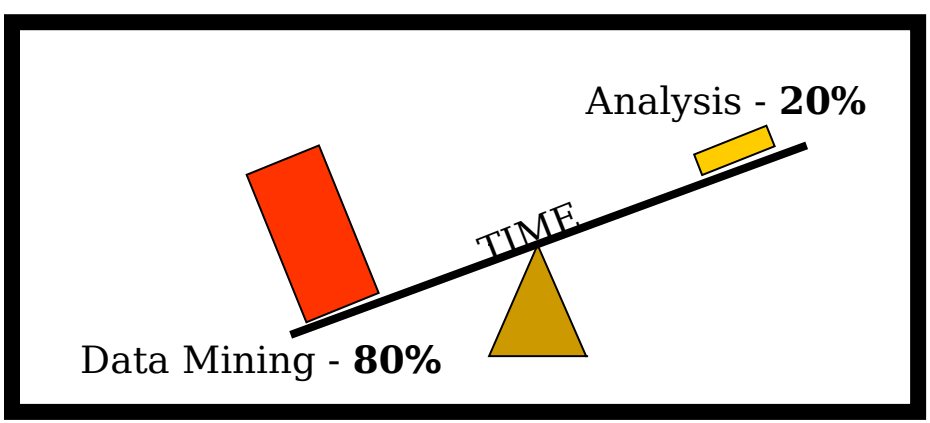
Develop and implement processes and tools that:

Identify materiel requirements and resources

Provide integrated view of materiel readiness

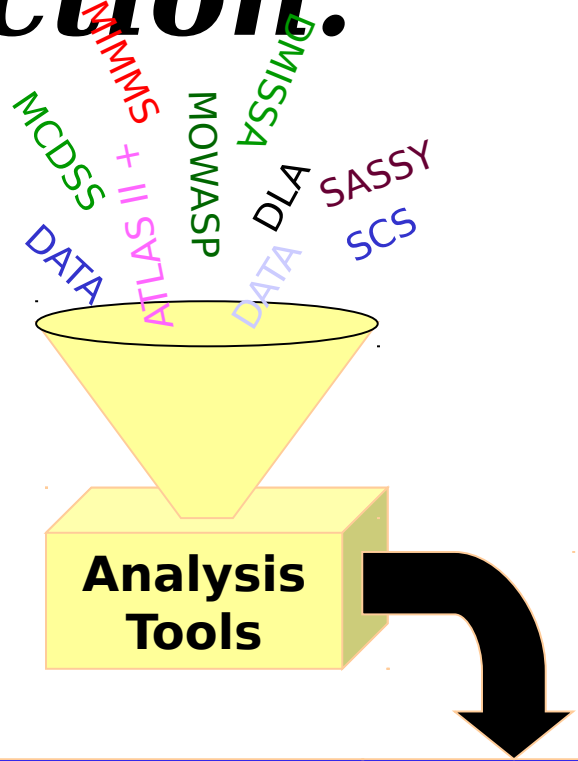
Support analysis using modeling and simulation

Provide decision quality information



Valuable tools in action.

Turns an ocean of data into decision quality intelligence!



asily Accessible, Understandable, Decision Quality Informatic

- **Readiness (MERIT)**
- **Cost of Readiness (CHART)**
- **DLM Requirements Determination**
- **Quad Model**
- **A_o MTBF (FAIL)**
- **ETC...**

TLCMI Project Brief

- What is TLCMI?
  - Total Life Cycle Modeling Initiatives
  - S&A Project Lead / CTC Contract Support
  - Develop USMC Logistics/Acquistion Decision Support Tools

Major Elements
(Original Efforts)

- MERIT – Marine Corps Equipment Readiness Information Tool

- DSC – Decision Support Capabilities Toolkit

Marine Corps Logistics Command

LOGCOM

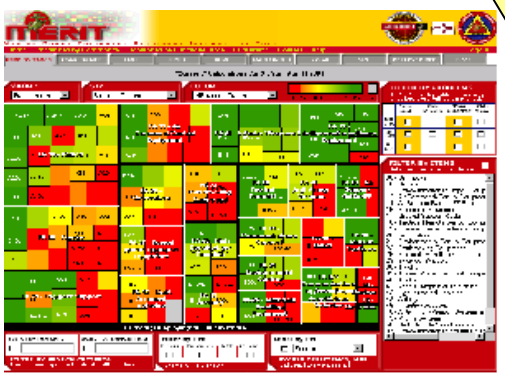
Barstow, California · Albany, Georgia · Jacksonville, Florida

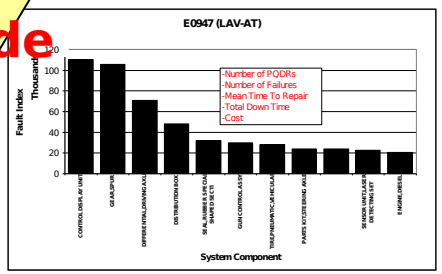
Problems Exist, Decisions Must Be Made

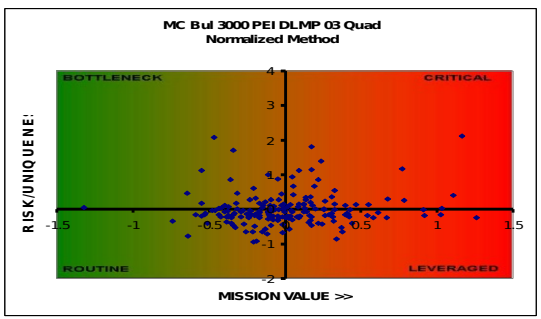
Data is everywhere

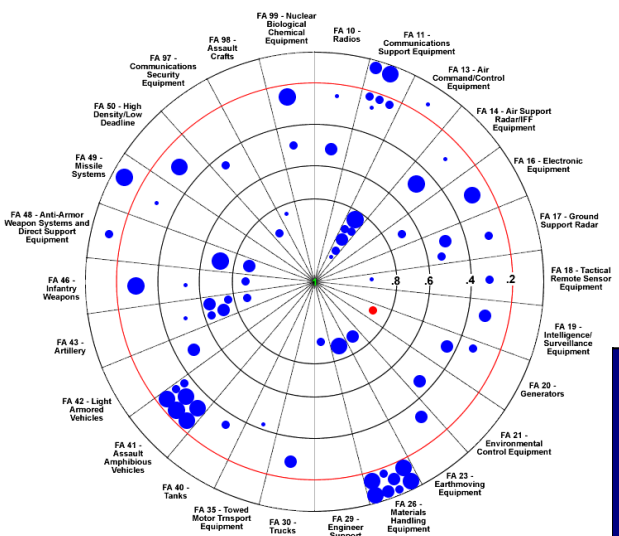
Consolidate & Analyze Data

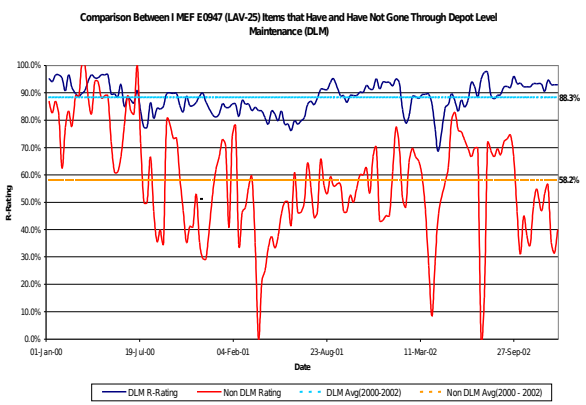
Build Tools & Perform Analyses








FA 99 - Nuclear Biological Chemical Equipment
FA 10 - Radios
FA 11 - Communications Support Equipment
FA 13 - Air Command/Control Equipment
FA 14 - Air Support Radar/IFF Equipment
FA 16 - Electronic Equipment
FA 17 - Ground Support Radar
FA 18 - Tactical Remote Sensor Equipment
FA 19 - Intelligence/ Surveillance Equipment
FA 20 - Generators
FA 21 - Environmental Control Equipment
FA 23 - Earthmoving Equipment
FA 26 - Materials Handling Equipment
FA 29 - Engineer Support
FA 30 - Trucks
FA 35 - Towed Motor Trnsport Equipment
FA 40 - Tanks
FA 41 - Assault Amphibious Vehicles
FA 42 - Light Armored Vehicles
FA 43 - Artillery
FA 46 - Infantry Weapons
FA 48 - Anti-Armor Weapon Systems and Direct Support Equipment
FA 49 - Missile Systems
FA 50 - High Density/Low Deadline
FA 97 - Communications Security Equipment
FA 98 - Assault Crafts



Intelligence

Under Construction

- SCOPE – Supply Chain Operational Performance Enhancement Tool
  - Allows Materiel Managers to forecast and plan to satisfy SCM customer demands
- COSIS – Care of Supplies in Storage
  - Identifying cost drivers and impact of budget decisions on In-Stores assets.

Under Construction

- Depot Level Maintenance Program Automation and Decision Support Tools
  - Depot Level Requirements Determination Model
  - Master Work Schedule Automation
    - SCMC(Planning: Analysis/Forecasting/DLMP Conference)
    - Maintenance Directorate (MWS Planning)
    - Maintenance Centers (Production Scheduling)
    - SCMC (Production: Execution)
  - Dynamic Equipment Repair Optimization Model
  - Automating Core Calculations
  - Optimal Depot Workload
  - TPFFD/TEEP correlation analysis

Under Construction

- Equipment Profile Metrics Development
  - MTBF/MTTR
  - Cost Trends (Org/Intermed/Depot)
  - Readiness Trends (USMC/MEF/Unit by TAMCN, FA, Commodity)
  - Effect of DLM on O&I Labor & Cost
  - Fault Isolation/Frequency of Component Failure Analysis

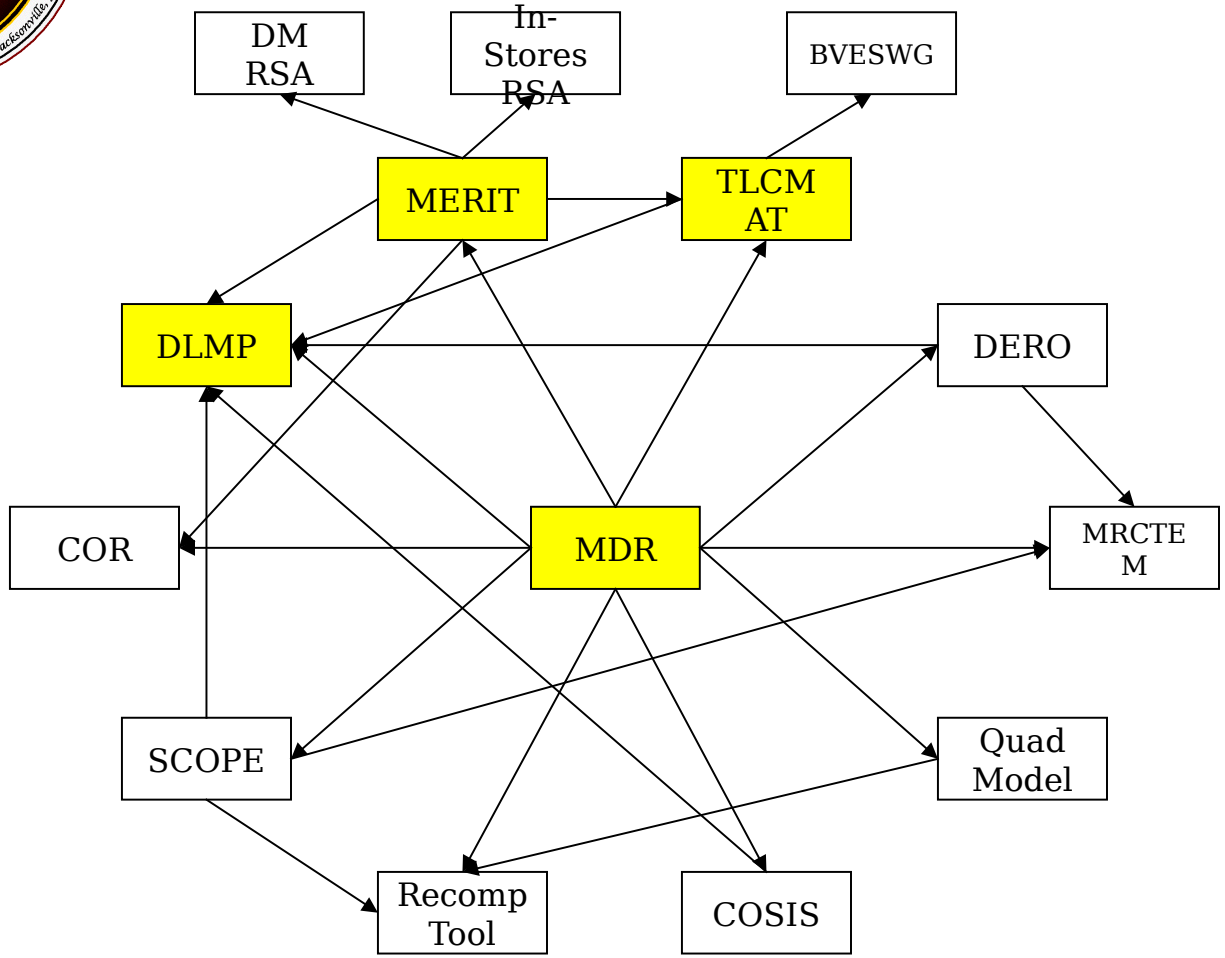
Under Construction

- Cost of Readiness Model (COR)
  - Affordability Index (Dartboard)
  - Parts Map
  - Life Cycle Management Costs

Under Construction

- Quad Model
  - Materiel Management
  - Procurement & Contracts
  - Acquisitions
- MPF Regeneration Cycle Time Estimation Model (MRCTEM)
- SCMC Re-Computation Model

How Are They Related?



Marine Corps Logistics Command
LOGCOM
Barstow, California
Albany, Georgia
Jacksonville, Florida

Questions

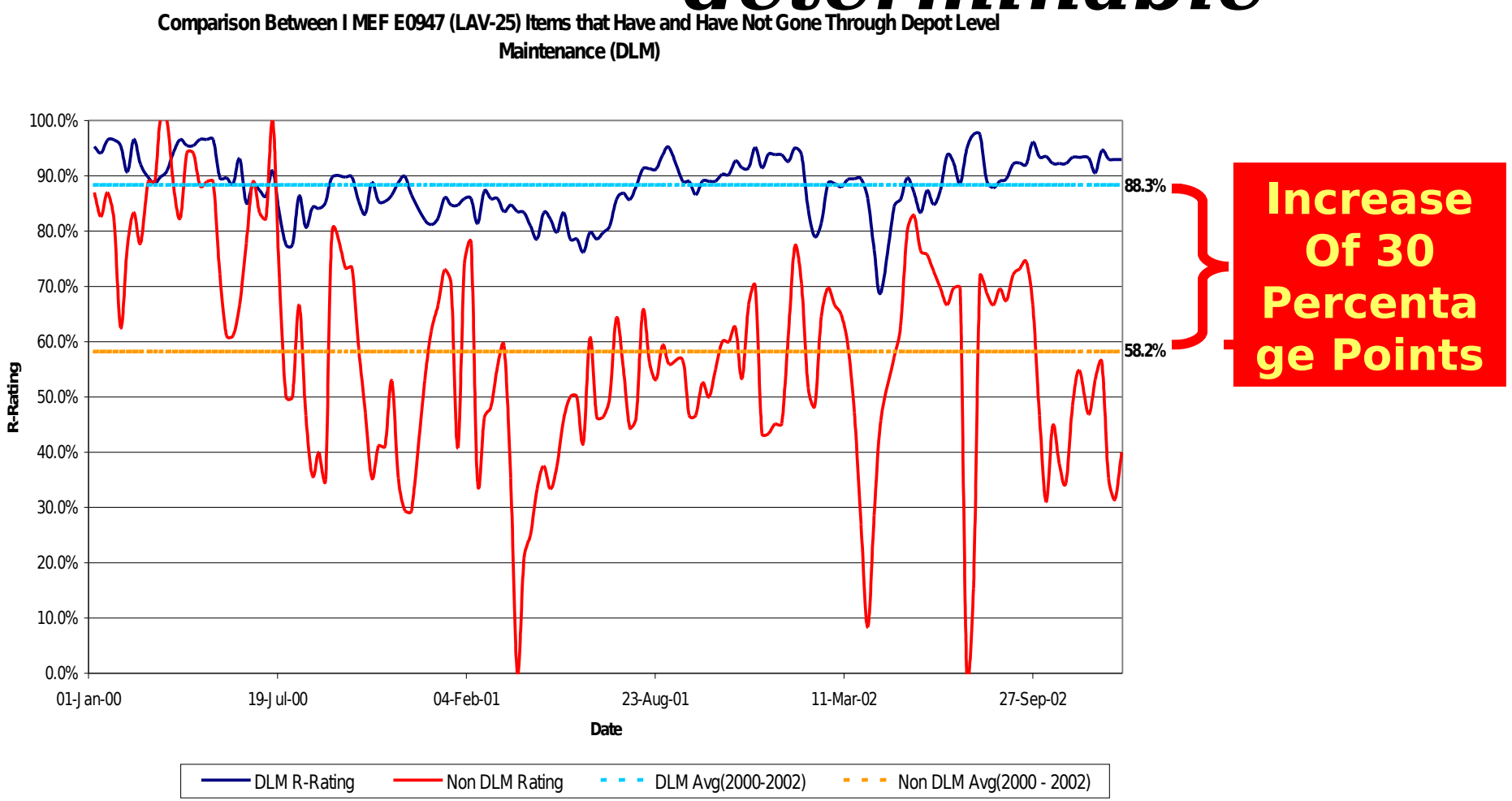
Back Up

- Back Up Slides

Determining Depot Level Maintenance requirements

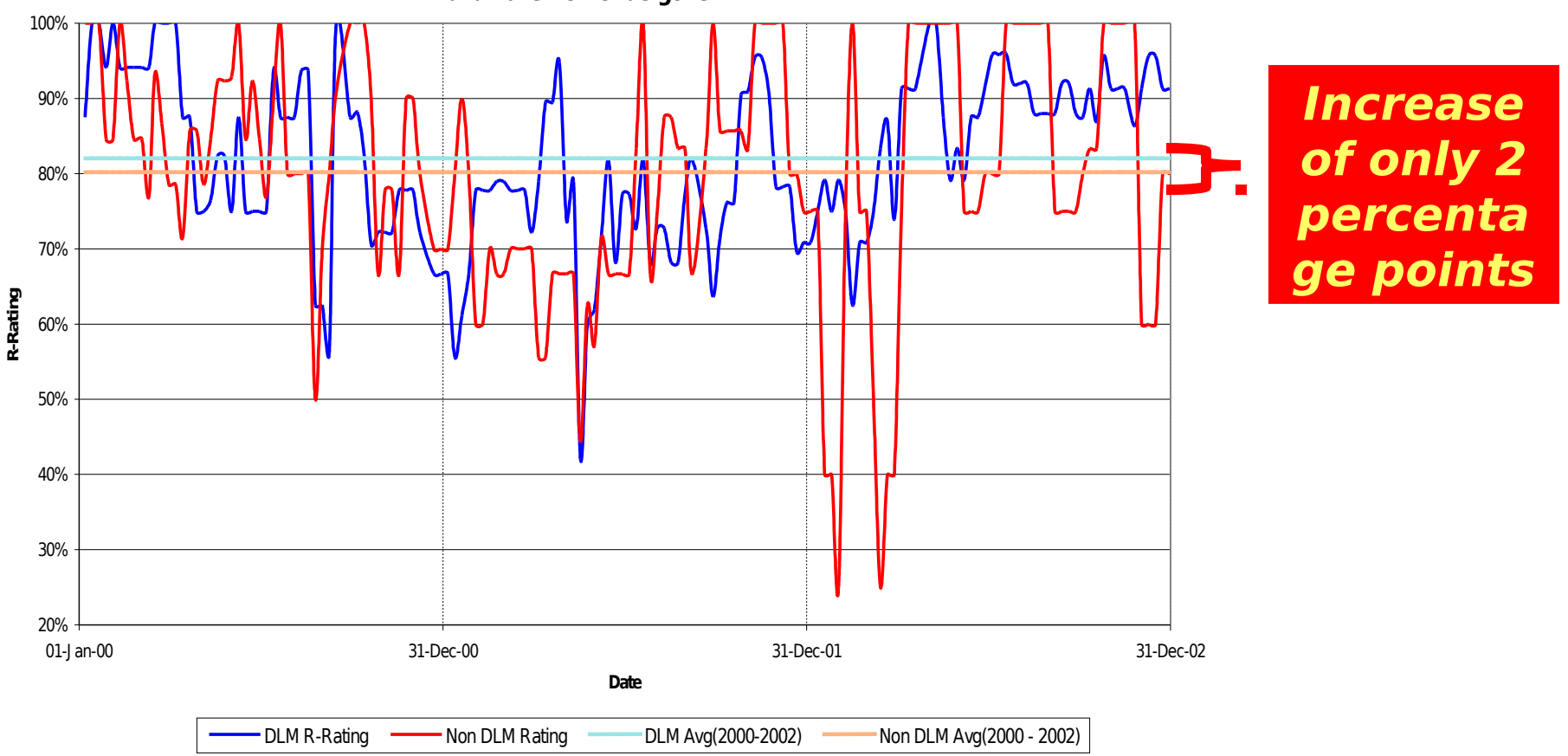
- Determines effectiveness of DM on ***Operational Availability*** (A_o) of ground equipment.
- **Predicts** effects of DM on future A_o
- Identifies **optimal product mix** for DM to attain a desired A_o.
- Predicts **decrease in organizational level** maintenance associated with increased reliability

contribution to readiness is determinable



I MEF LAV-25 R-Ratings for DLM and Non-

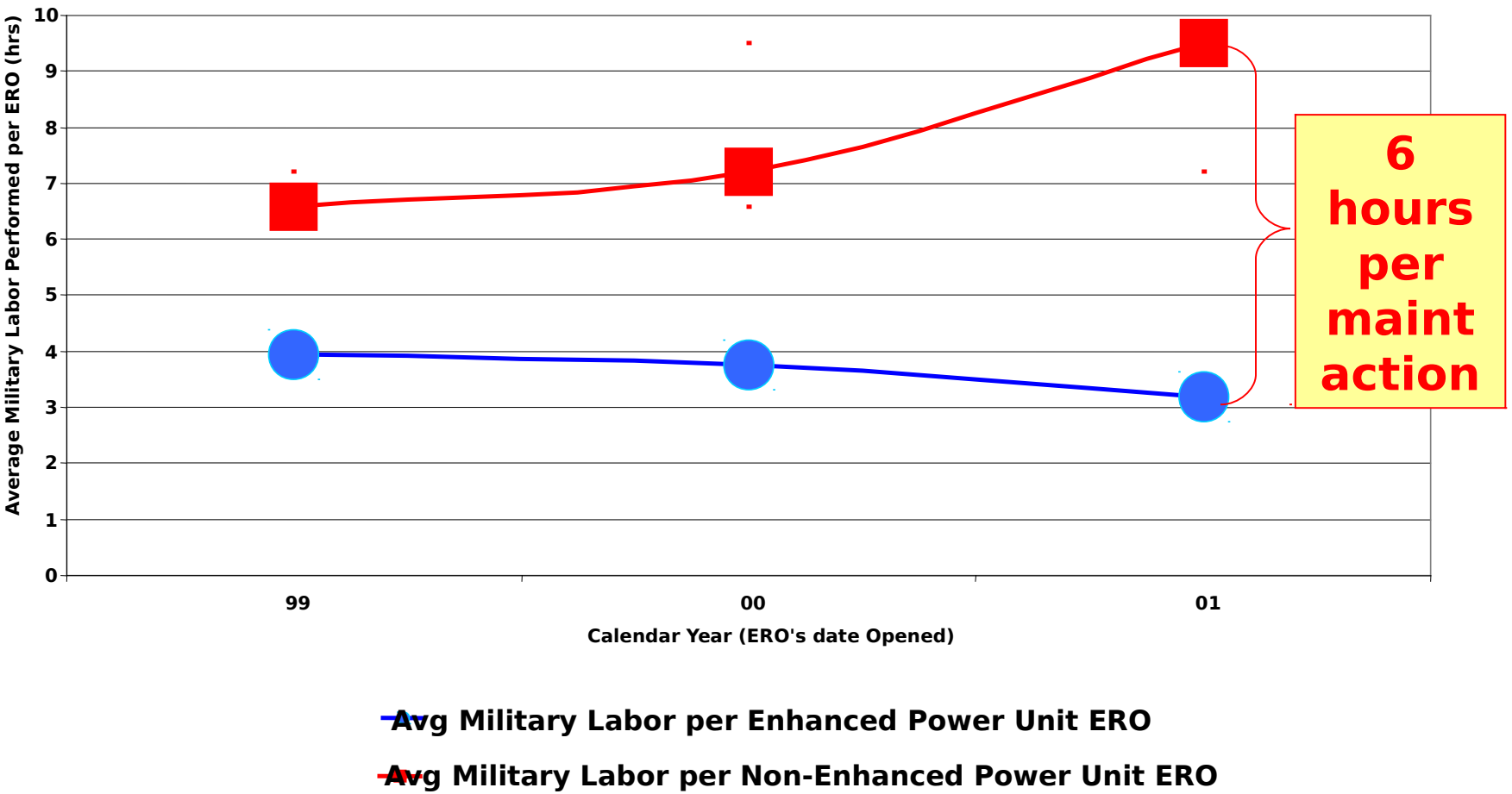
Depot Maintenance contribution to readiness is



Increase of only 2 percentage points

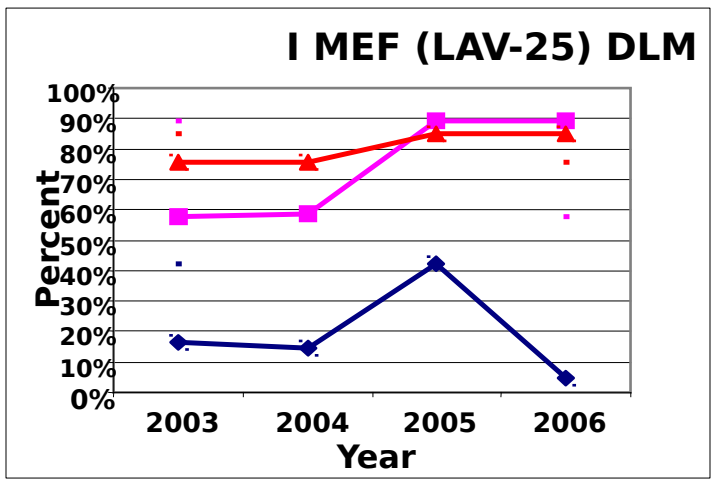
I MEF LAV-AT R-Ratings for DLM and Non-DLM

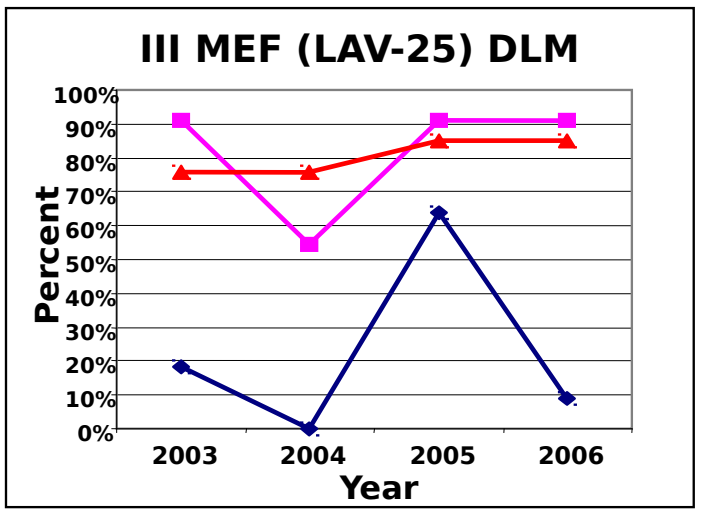
DM impact on the fleet is measurable

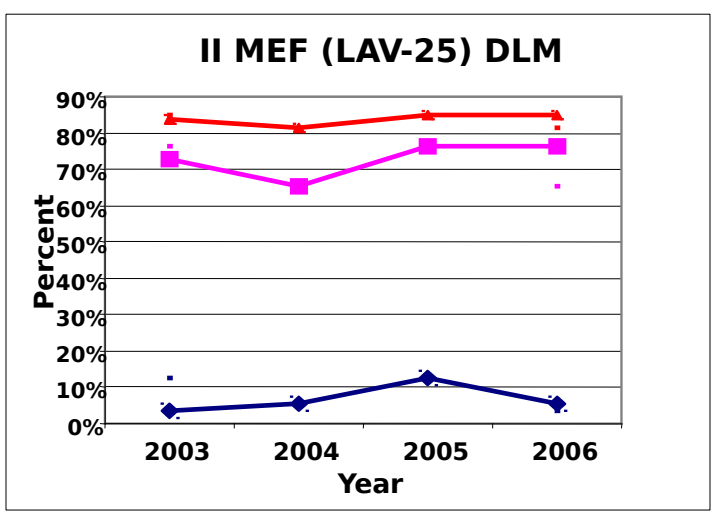


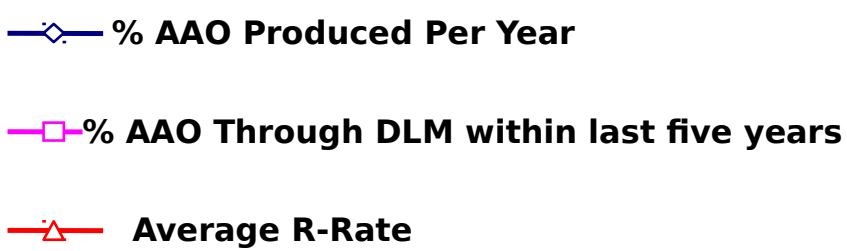
All data with a Military Labor value greater than 1,000 hours were deleted!

Readiness return is predictable

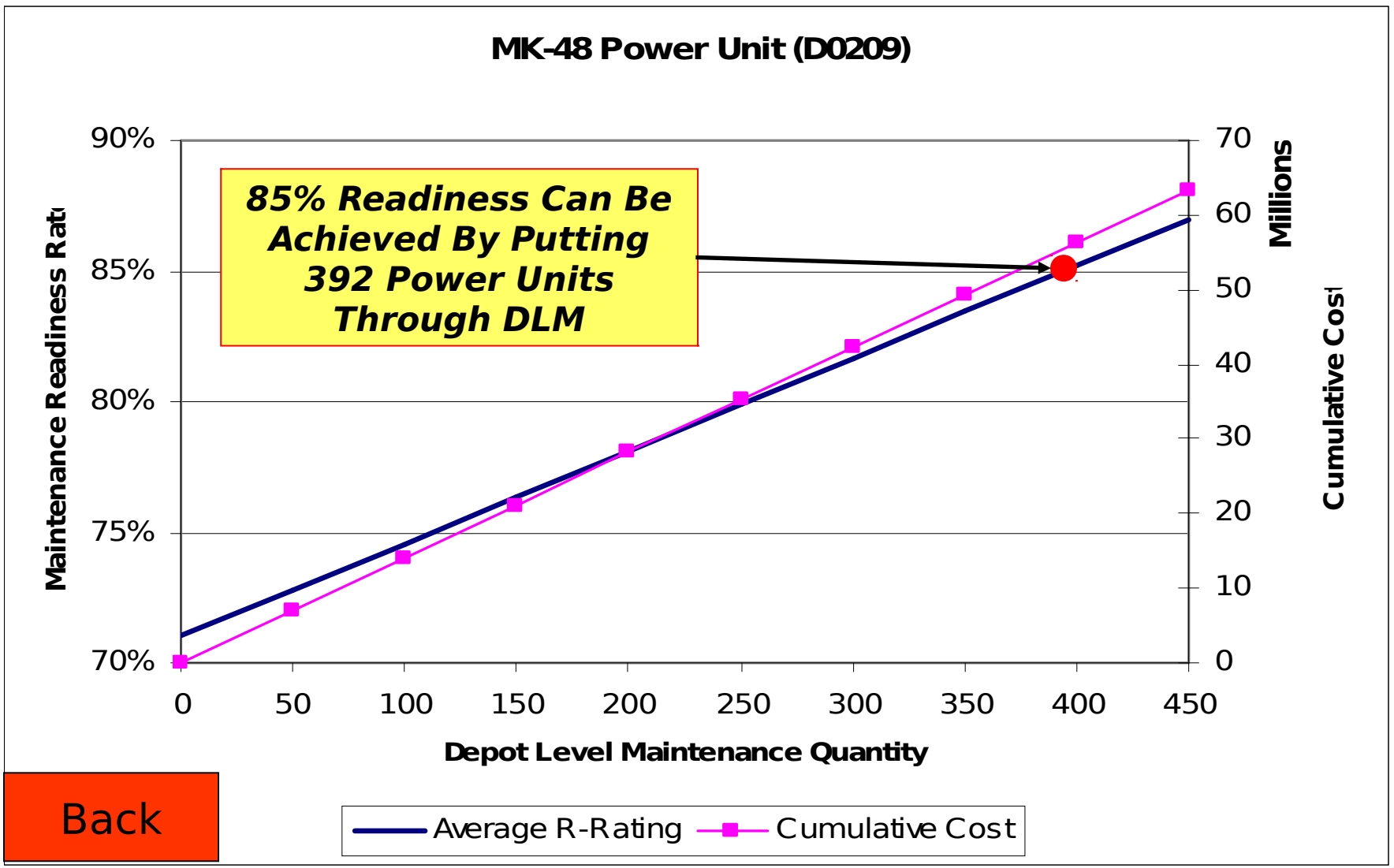








Predicting DM effects facilitates quality decision making



Back

Fault Analysis Isolation for Logistics (FAIL)

Statistical analysis of an end-item

Looking for correlation among:

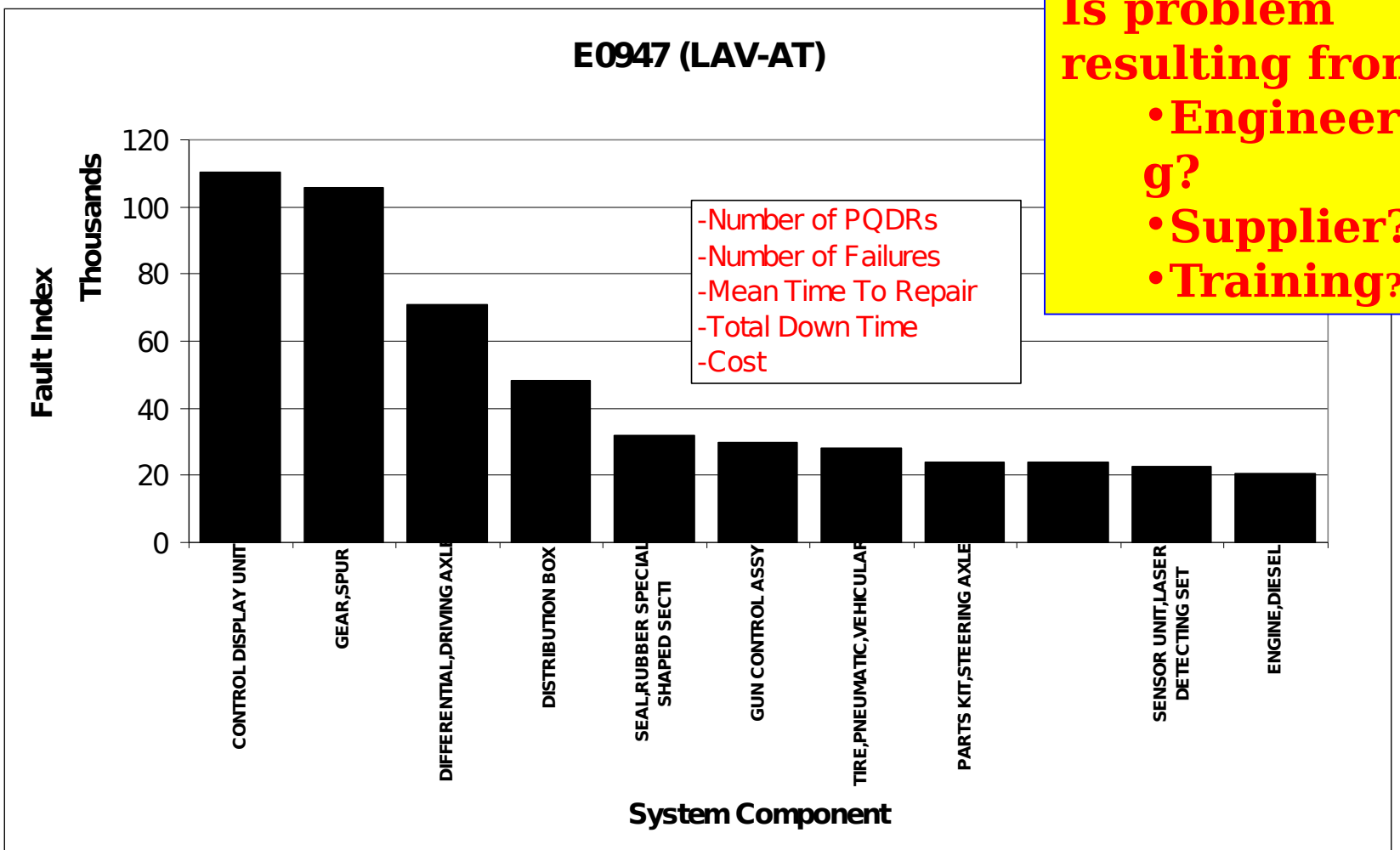
Dead-lining maintenance tasks
Product Quality Deficiency Reports
Quantity of parts consumed

Precursor to Mean Time Between Failure at the component level

Supports quality decision making:

Hanging a new part that has an engineering deficiency does not increase readiness

FAIL identifies major readiness degraders



Is problem resulting from:

- **Engineering?**
- **Supplier?**
- **Training?**

FAIL analysis of P-19 Crash Fire Rescue Truck

Water pumping system

High failure rate before and after DM

Pumping system not reengineered

Net result

No increase in readiness due to continued pumping system failures.

Back

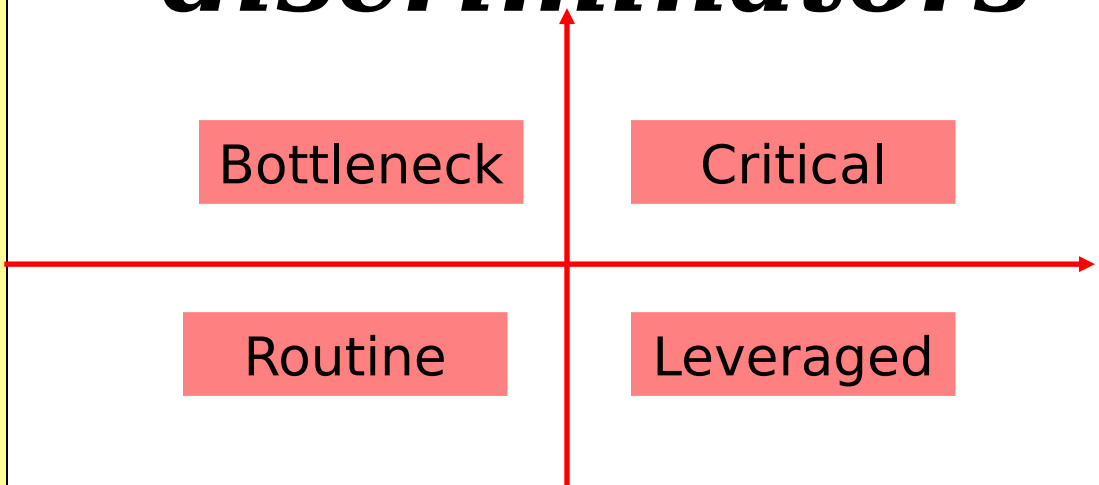
Quadrant Model adaptable to weapon systems management

- **A working model at the component level**
- **Currently under test and evaluation**
- **Flexible**
  - **Concept Fits Almost Any Situation**
  - **What Are The Discriminators (The Hard Part)**
- **Policy (Another Hard Question To Answer)**

Principal End Item Quadrant Model discriminators

Y-Values (Uniqueness & Risk)

- **MARFOR Density**
- **Percent through DM**
- **Unit Cost**
- **MARFOR Parts Cost**
- **Acquisition Advice Code**
- **DM Costs**
  - **Parts**
  - **Labor**



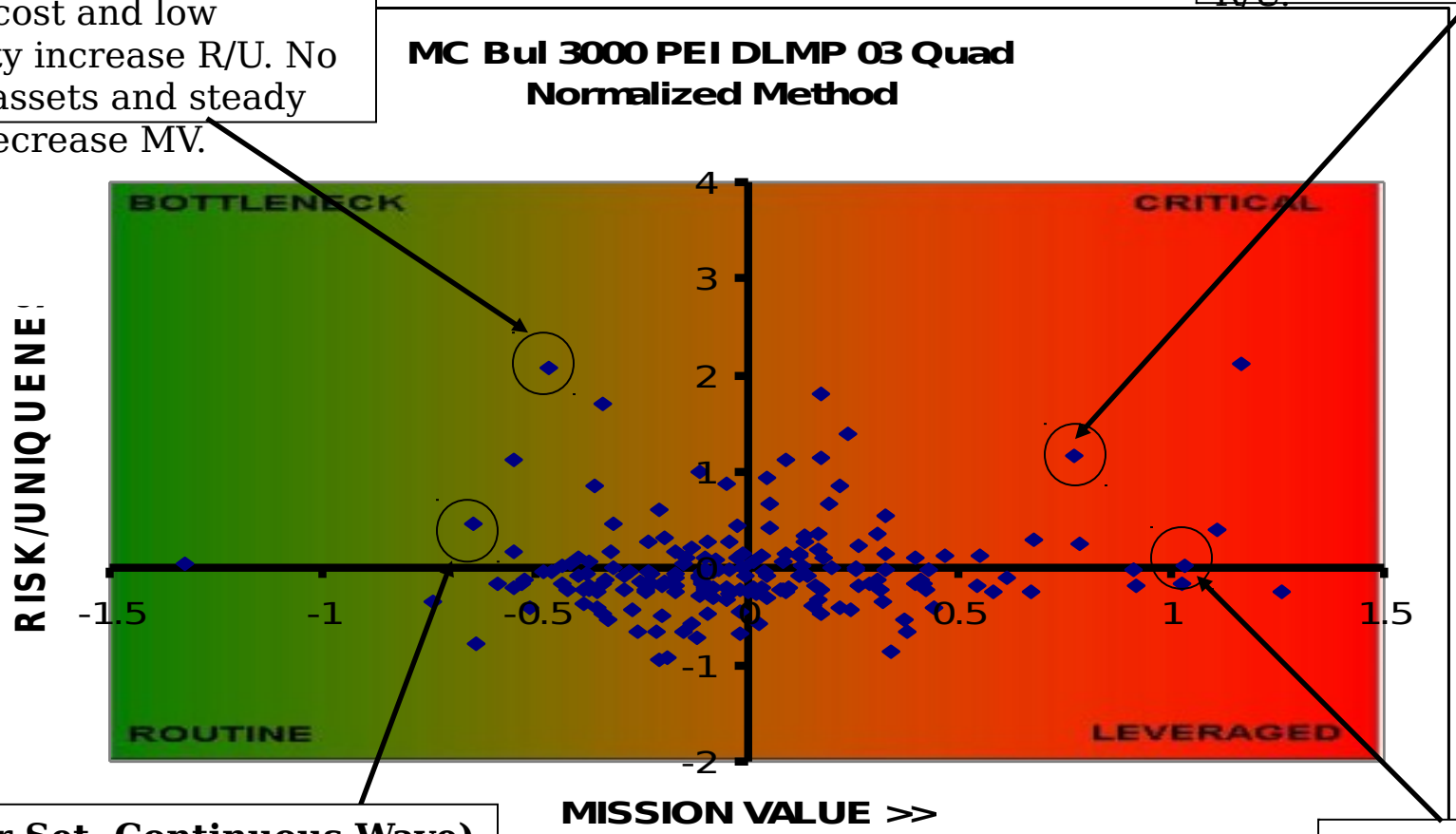
X-Values (Mission Value)

- **War fighting Value**
- **MPS Equipment Density**
- **Annual Material Readiness**
  - **Trends**
  - **Variance**
- **Age**
- **Service Life Remaining**

Quad Model

Fire Finder Radar Set – High cost and low density increase R/U. No MPS assets and steady MR decrease MV.

M1A1 Main Battle Tank – High cost and complexity drive high R/U.

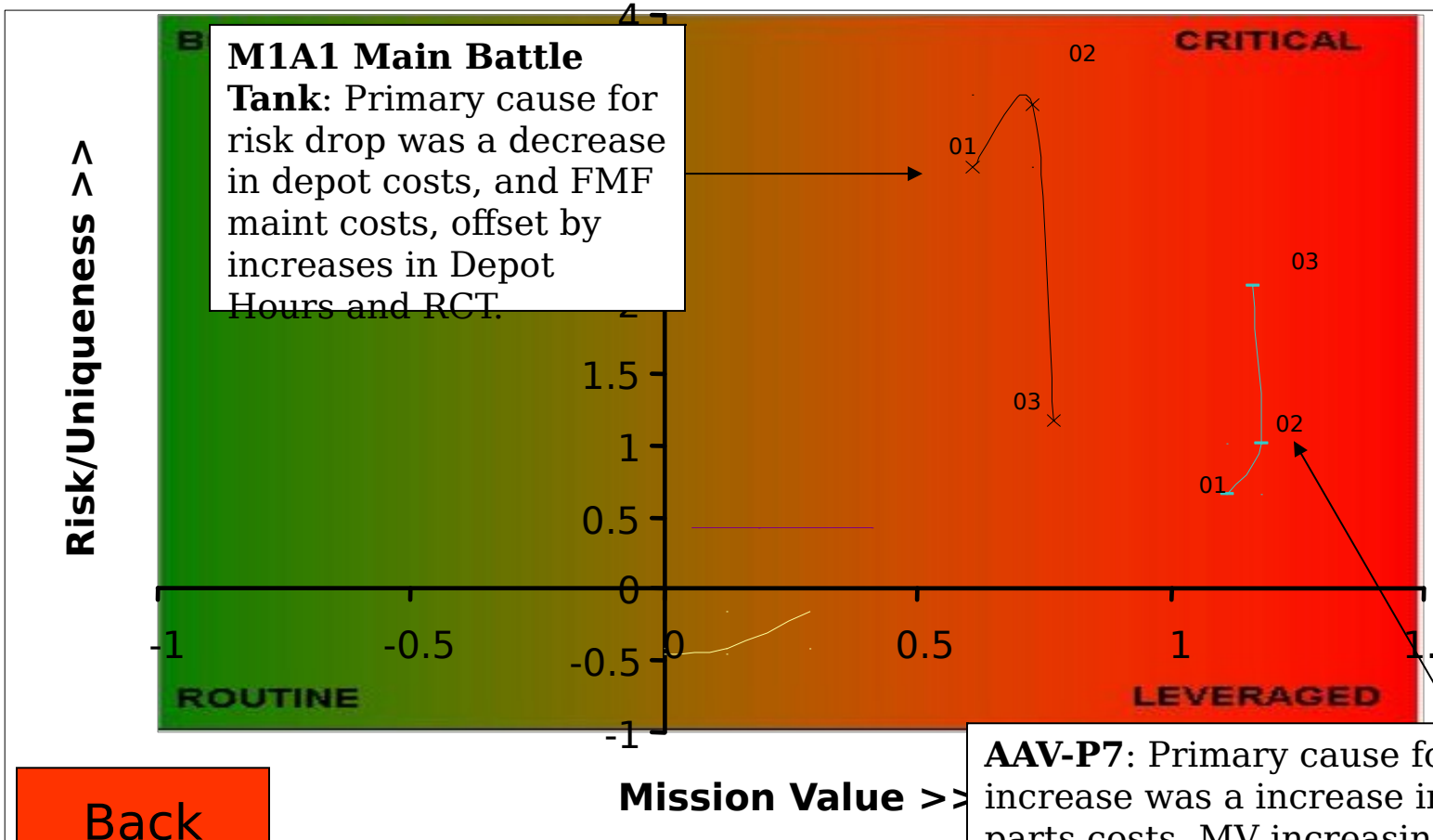


Radar Set, Continuous Wave) - Mixed signals on MV, high operational costs and has had DM decrease MV.

IFAV - Volatile MR increases MV. Lack of cost data decrease R/U.

End Items move over time based on changes in discriminators

PEI DLMP Quad Normalized Mess Migration Patterns 2001-2003



M1A1 Main Battle Tank: Primary cause for risk drop was a decrease in depot costs, and FMF maint costs, offset by increases in Depot Hours and RCT.

AAV-P7: Primary cause for risk increase was a increase in FMF parts costs. MV increasing due to falling MR. Partially offset by additional items in depot maint.

Back

Dynamic Equipment Repair Optimization (DERO) Model

Models predetermined total DM requirements

Provides multi-year solution sets based on:

War fighting values

Readiness objectives

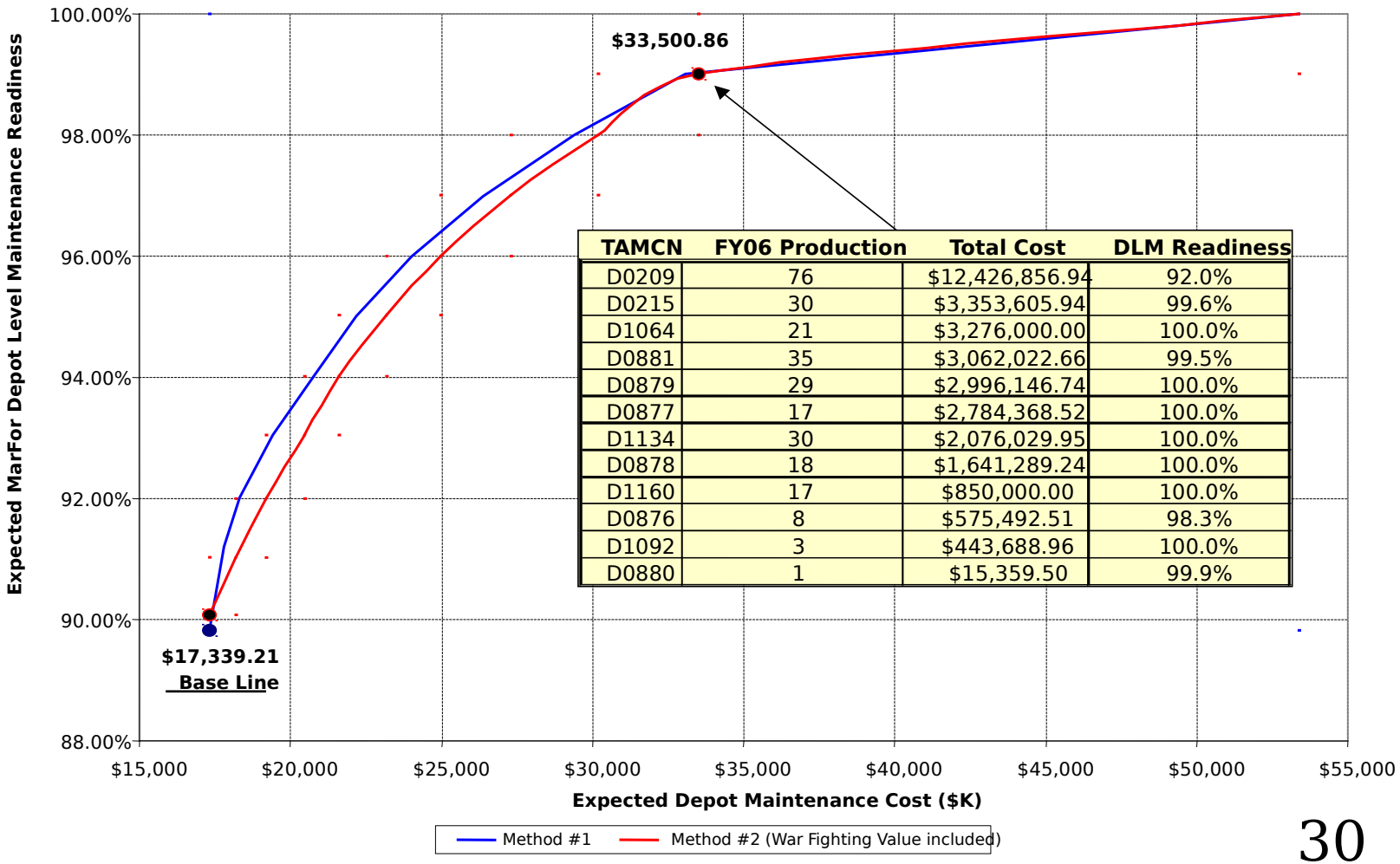
Funding constraints

Multiple other factors

Constraints and objective functions under review

Diminishing returns with a functional area

Automotive Commodity-Depot Maintenace Cost vs Readiness in FY06



TAMCN	FY06 Production	Total Cost	DLM Readiness
D0209	76	$12,426,856.94	92.0%
D0215	30	$3,353,605.94	99.6%
D1064	21	$3,276,000.00	100.0%
D0881	35	$3,062,022.66	99.5%
D0879	29	$2,996,146.74	100.0%
D0877	17	$2,784,368.52	100.0%
D1134	30	$2,076,029.95	100.0%
D0878	18	$1,641,289.24	100.0%
D1160	17	$850,000.00	100.0%
D0876	8	$575,492.51	98.3%
D1092	3	$443,688.96	100.0%
D0880	1	$15,359.50	99.9%

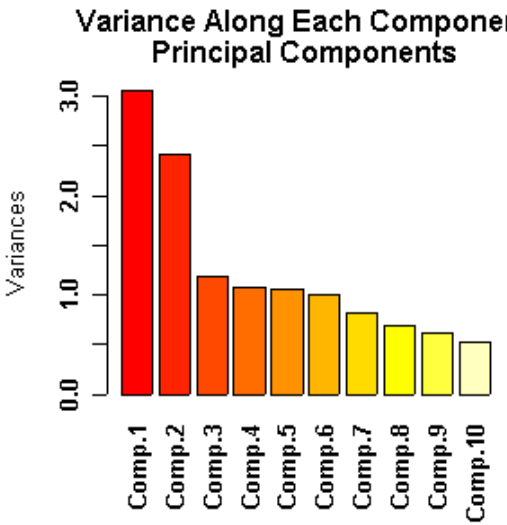
Which Systems Should Be Tracked?

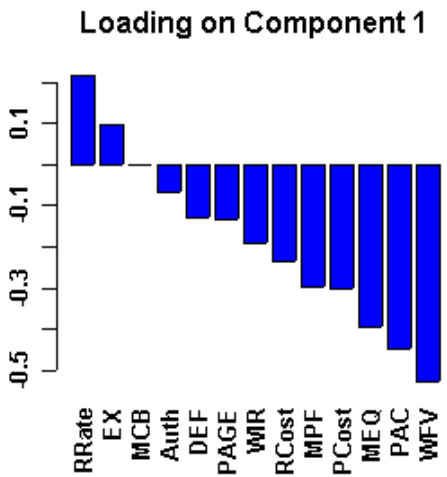
- Identify Essential Characteristics
  (Are these the right ones?)
  - Percent of expected lifetime of system
  - R Readiness Rate
  - O & I Parts Costs
  - Replacement Cost
  - Warfighting Values
  - MPF/MCBul 3000/Pacing/MEQPT
  - Quantity of WIRs
  - AAO/Deficient/Excess
- Reduce 13 Dimensions to one

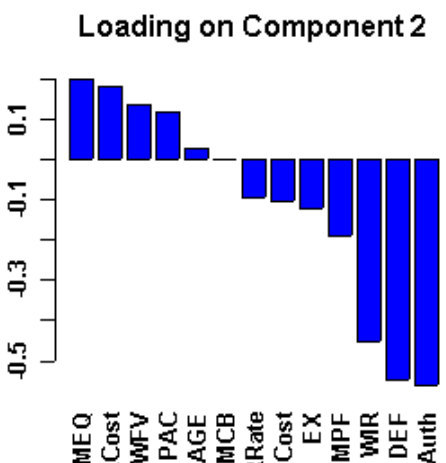
Another Way That Considers Essential Characteristics Of The PEI

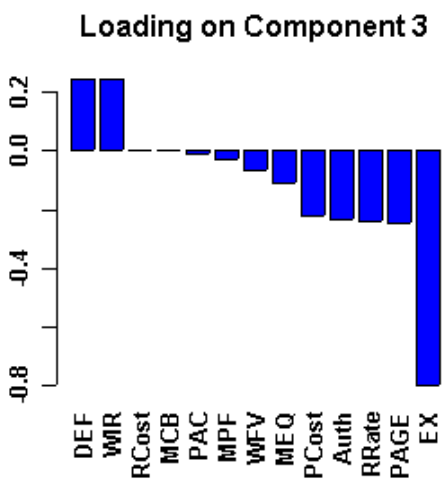
Graphically

- Data on the 13 Equipment Characteristics (From Previous Slide) Collected on All 184 MCBul 3000 Tamcns
- Data Normalized
- PCA Algorithm
- But What Does It Mean?

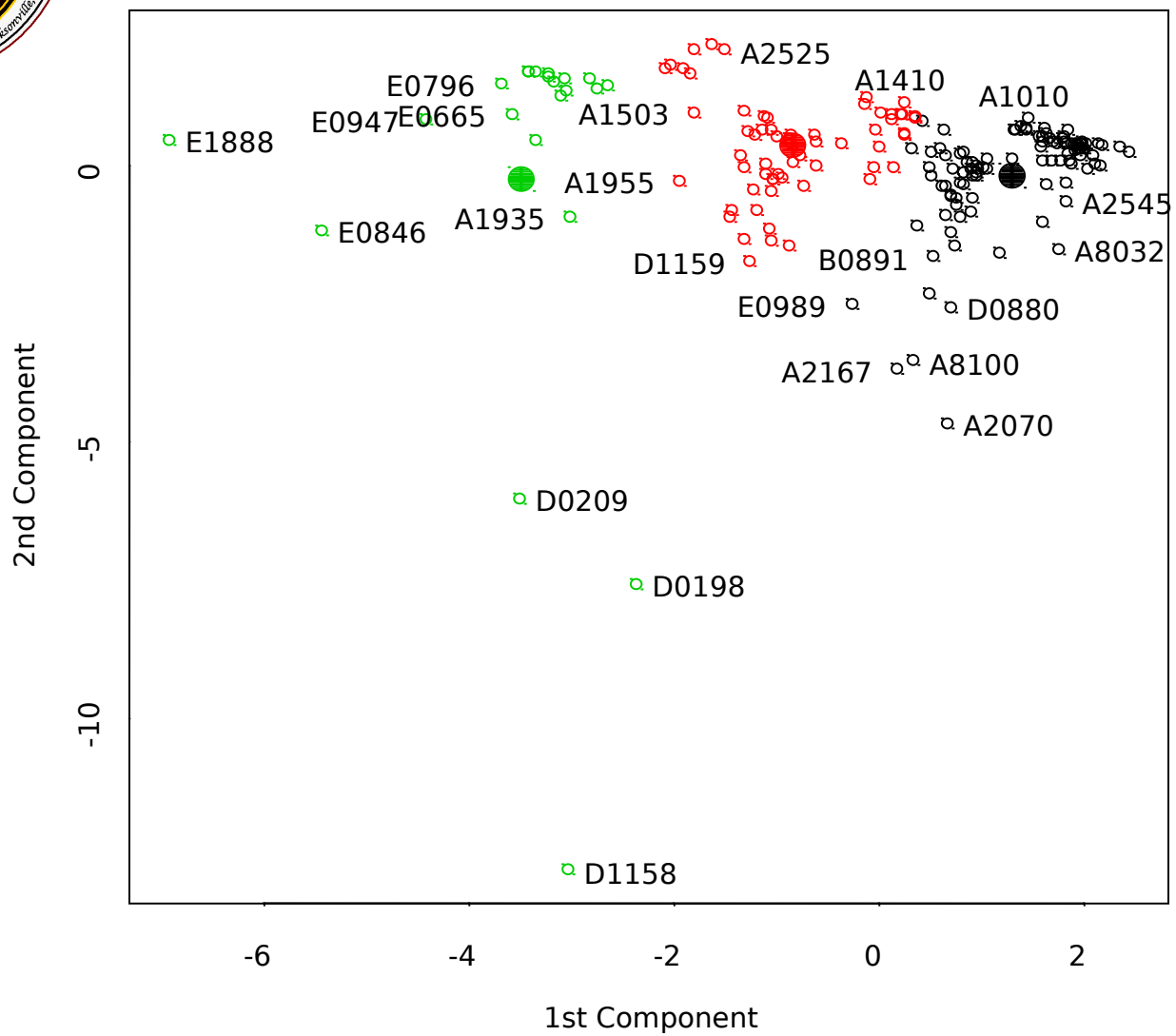








A Graphical Representation



Bottom & Top Ten

Rank	TAMCN	Name
-6.93	E1888	M1A1
-5.42	E0846	AAVP7A1 RAM/RS
-4.41	E0947	LAV-25
-3.69	E0796	AAVC7A1 RAM/RS
-3.58	E0665	M198
-3.50	D0209	MK48A1 MOD0
-3.42	E0856	AAVR7A1 RAM/RS
-3.42	E0942	LAV-ATA1
-3.35	E0949	LAV-M
-3.34	E0935	M220A3
1.99	A1520	AN/TSQ179(V)2
2.00	A8038	TSEC/KG40A-P
2.02	A3235	AN/TSQ190(V)2
2.03	E0727	AN/PPX3B
2.09	A1530	AN/PPN19(V)2
2.11	E1837	AN/PAS18
2.14	A2629	AN/MYQ8A
2.16	E1475	M82A3
2.18	A2634	AN/UYQ83
2.35	A1219	SS2
2.45	A0873	AN/UYQ91(V)2

Bottom 10 Probably Should be Tracked

Top 10 Probably Don't Need To Be Tracked

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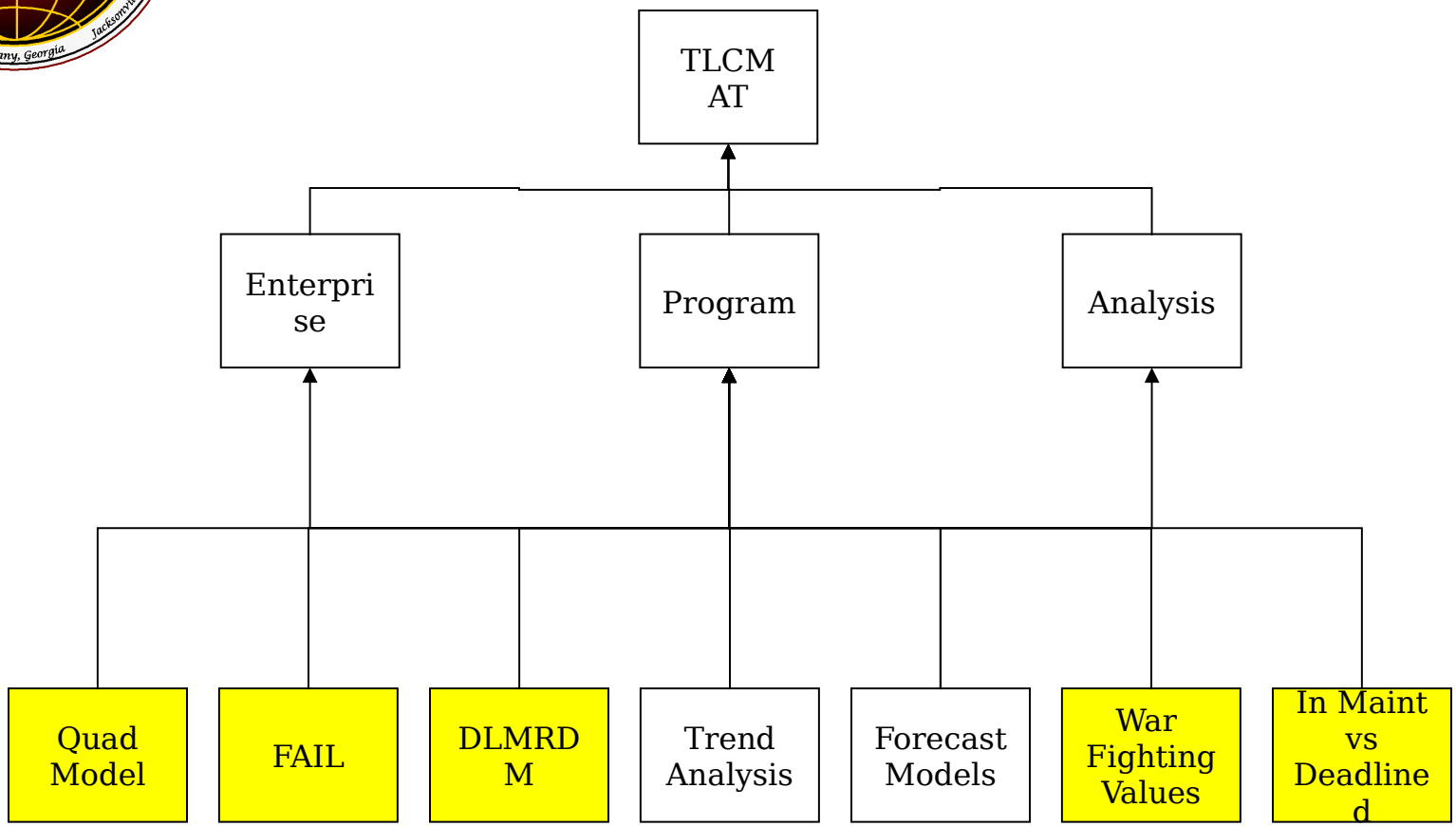
TLCM AT Relations



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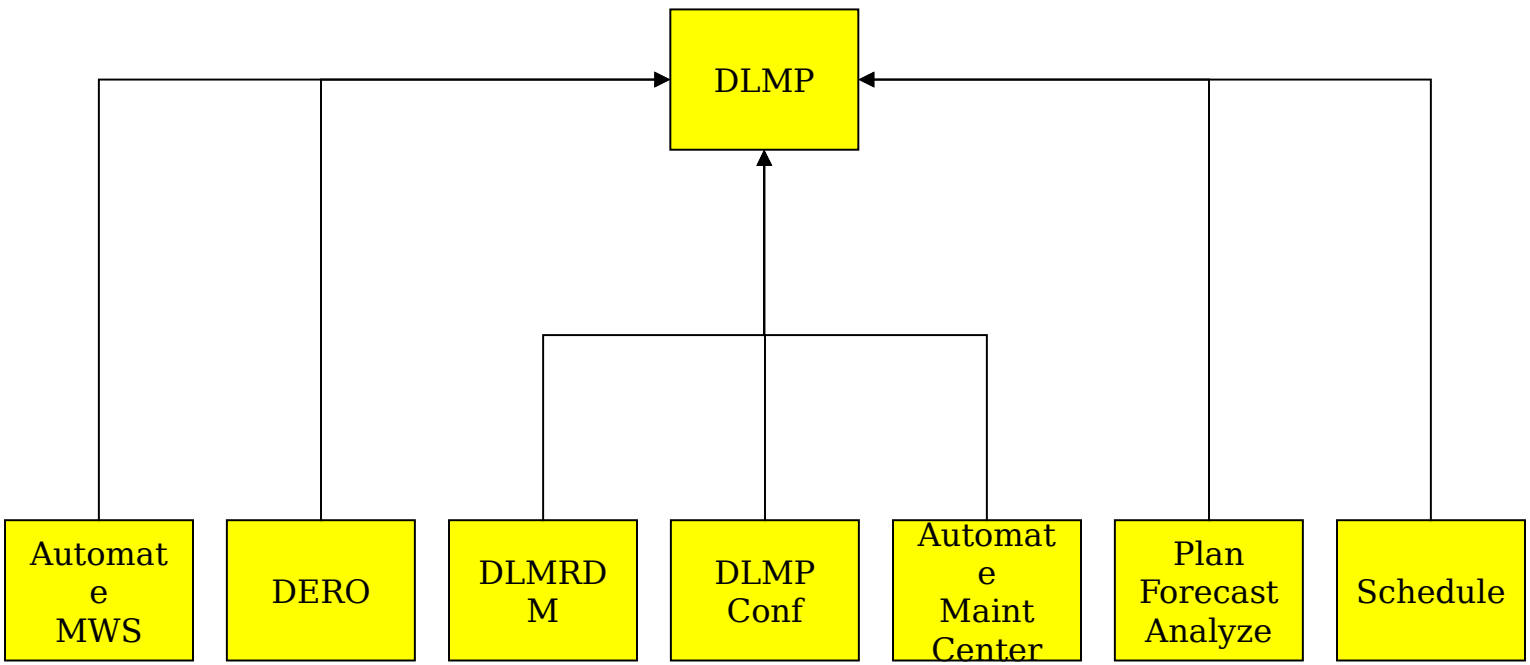
DLMP Relations



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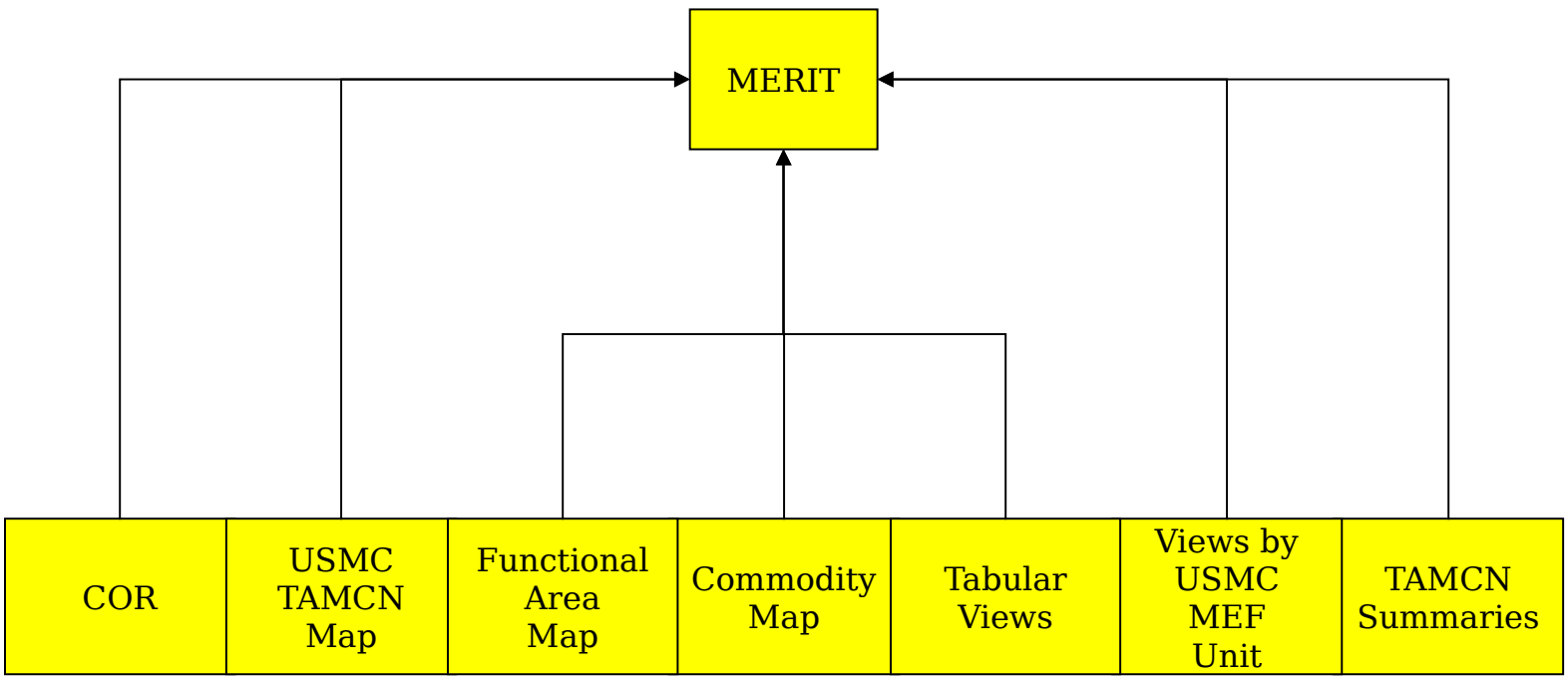
MERIT Relations



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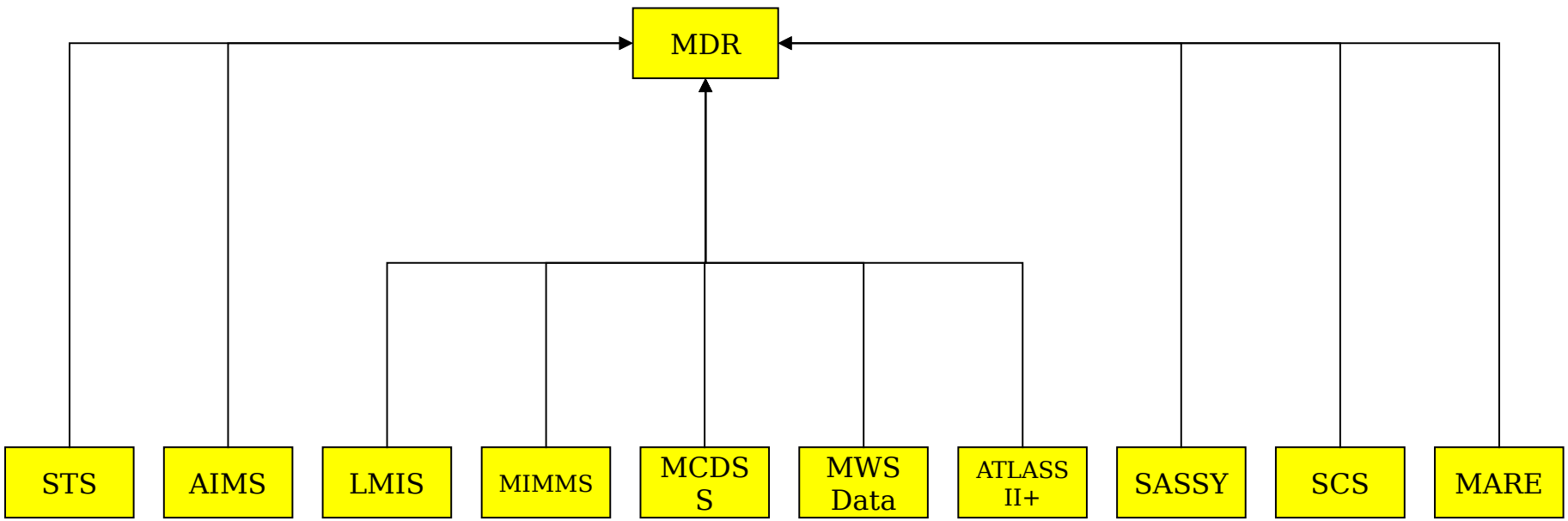
MDR Relations



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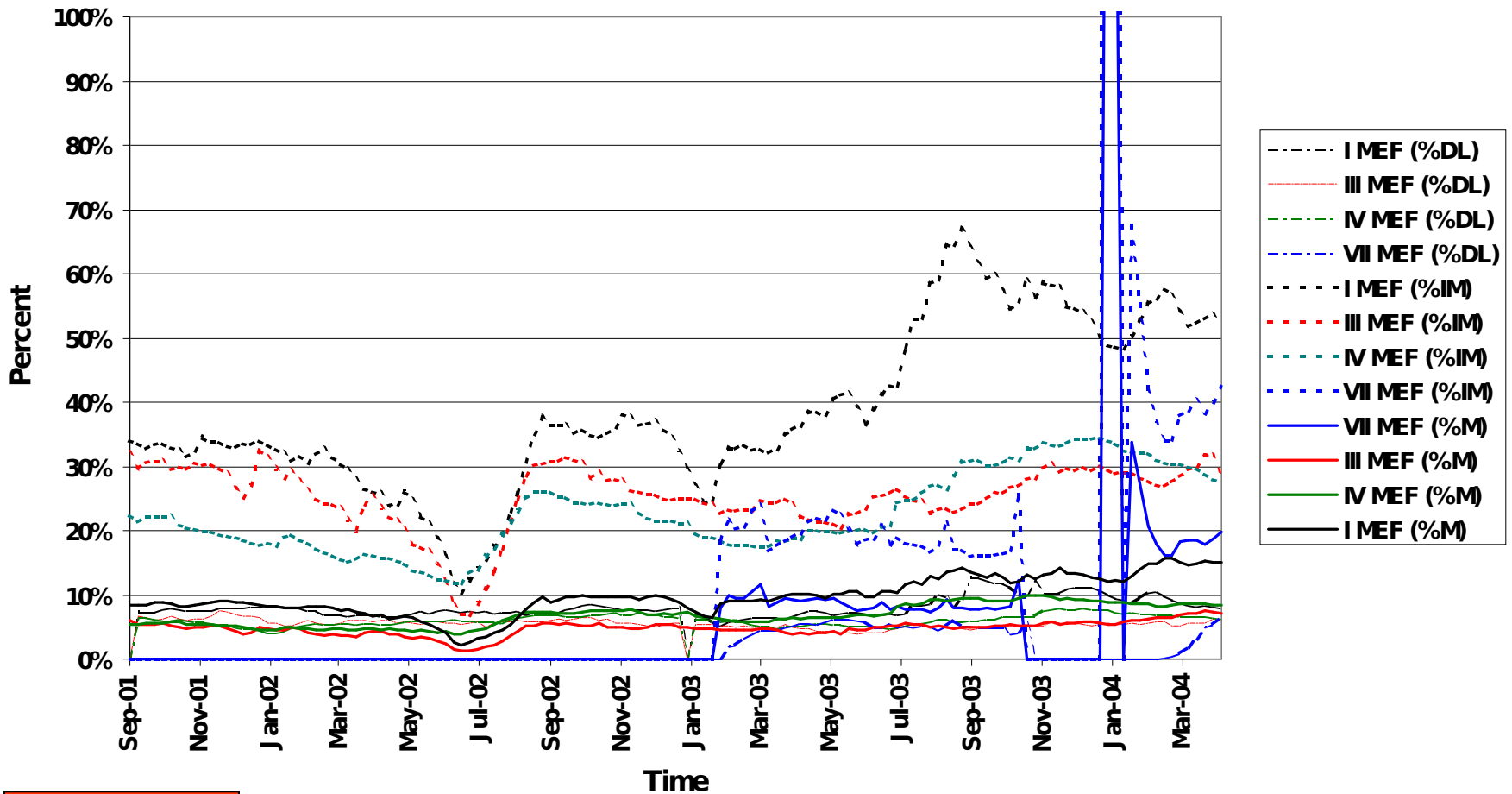
In-Maintenance vs Deadlined



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